

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:  
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 Haidian District, Beijing

CHINA SCIENCE PATENT AND TRADEMARK  
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## PCT

WRITTEN OPINION OF THE  
 INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing <i>(day/month/year)</i> <b>30 May 2018</b>	
Applicant's or agent's file reference <b>IP170299</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
International application No. <b>PCT/CN2017/103973</b>	International filing date <i>(day/month/year)</i> <b>28 September 2017</b>
International Patent Classification (IPC) or both national classification and IPC H04B 17/00(2015.01)i	
Applicant <b>TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al</b>	
Priority date <i>(day/month/year)</i>	

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/ <b>STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA China 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088</b>	Date of completion of this opinion <b>24 May 2018</b>	Authorized officer  <b>YAN,Sai</b>
Facsimile No. <b>(86—10) 62019451</b>	Telephone No. <b>86-(10)-53961605</b>	

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2017/103973

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed.
  - a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a)).
3.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
  - a.  forming part of the international application as filed:
    - in the form of an Annex C/ST.25 text file.
    - on paper or in the form of an image file.
  - b.  furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c.  furnished subsequent to the international filing date for the purposes of international search only:
    - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
    - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/CN2017/103973**

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	<u>1-18</u>	YES
	Claims	<u>None</u>	NO
Inventive step (IS)	Claims	<u>1-18</u>	YES
	Claims	<u>None</u>	NO
Industrial applicability (IA)	Claims	<u>1-18</u>	YES
	Claims	<u>None</u>	NO

2. Citations and explanations :

- [1] (1) Reference is made to the following document:
- [2] D1: CN103997352A 20 August 2014 (20.08.2014)
- [3] (2) Novelty and Inventive steps
- [4] D1 is regarded as being the closest prior art and discloses (see description, paragraphs [0082]-[0128]): In a second embodiment of the invention, there is provided an active antenna device 31 as illustrated in FIG. 3, where the massive active antenna unit includes an ROF photoelectric converting unit 301 and N arrays of active antennas 21. The ROF photoelectric converting unit 301 (corresponding to ROF transmitter) converts the transmission parameters into an optical signal, and transmits the optical signal over an optic fiber.
- [5] The transmission and reception calibrating unit amplifies the power of the one transmission calibration radio frequency signal transmitted by the primary calibration coupling circuit unit, and then demodulates the one transmission calibration radio frequency signal into a transmission calibration IQ analog signal, and outputs the transmission calibration IQ analog signal to the digital processing unit; and the digital processing unit converts the transmission calibration IQ analog signal into a transmission calibration IQ digital signal, and transmits the transmission calibration IQ digital signal through the optic fiber interface unit.
- [6] The subject matter of claims 1, 10 differs from D1 in that: receiving from the first ROF receiver a first analog signal, convert the first analog signal into a first digital signal and transmit the first digital signal to the second unit for calibration of the first ROF transceiver, and/or receive from the second unit a second digital reference signal, convert the second digital reference signal into a second analog reference signal and transmit the second analog reference signal to the second ROF transmitter for transmission to the second unit for calibration of the second ROF transceiver.
- [7] Therefore, the subject matter of claims 1-18 is novel under PCT Article 33(2).
- [8] The problem to be solved by claims 1, 10 may be regarded as: how to calibrate the signal. However, it is neither disclosed by the prior art nor common knowledge of a person skilled in the art. Therefore the subject-matter of claims 1, 10 involves an inventive step in the sense of Article 33 (3) PCT, and the subject-matter of claims 2-9, 11-18 which are directly or indirectly dependent on claims 1, 10 involves an inventive step in the sense of PCT Article 33 (3) PCT.
- [9] (3). Industrial applicability
- [10] The invention of claims 1-18 can find industrial applicability, and therefore meets the criteria set out in PCT Article 33(4).